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Some Empirical Evidence on the Relationship Between Quarterly GPPA Earnings, Historical Cost Earnings, and Cash Flow Data

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Abstract

This article provides some preliminary evidence on the impact of general purchasing power adjustments on quarterly earnings data for a sample of twenty-three (23) firms selected from the airlines industry. Descriptive statistics are generated for the following three series: 1) Quarterly Earnings - Historical Cost, 2) Quarterly Earnings - General Purchasing Power Adjustments, and 3) Quarterly Cash Flow Data. We report mean-variance information on all three series. These results enable us to assess the impact of the GPPA transformations on the levels of the quarterly earnings series. Correlational statistics are provided via two separate approaches: 1) an analysis of the partial correlation coefficients of all possible pairings of the three series and 2) an assessment of the statistical significance of the lags of the bivariate time-series cross-correlation coefficients for each paired series. These tests provide preliminary evidence on the lead/lag relationships between the two earnings series and the cash flow series.

Some Empirical Evidence on the Relationship Between Quarterly GPPA Earnings, Historical Cost Earnings and Cash Flow Data

The Financial Accounting Standards Board (FASB) has recently called for a wide range of research projects on financial reporting and changing prices.[1] FASB is apparently interested in promoting varying research efforts to provide input to a comprehensive review of FASB Statement No. 33. It intends to undertake this review within five years of Statement No. 33's publication date. Several alternative research questions were specifically delineated by FASB in an effort to structure the upcoming, multi-faceted research efforts into the following areas: (1981, pp. 7-9)

a) Usage of GPPA data by analysts and other professional users.

b) Use by and effects of GPPA data on management.

c) GPPA data and governmental agencies.

d) Capital market effects of GPPA data.

e) Time series patterns of GPPA data.

The purpose of this article is to provide some comparative empirical evidence on the descriptive properties of Quarterly GPPA earnings data vis-a-vis Historical Cost (HC) earnings and Cash Flow (CF) data.[2] Our efforts can be categorized under research question e) above. Specifically, we address the dual questions: How does the statistical behavior of Quarterly GPPA earnings data compare with the behavior of corresponding information in the quarterly HC earnings data as well as CF data? Secondly, are there evidences of any lead/lag relationships between the two earnings series and the CF series?

BACKGROUND

FASB has established certain broad guidelines to assess the usefulness of alternative types of information regarding the effects of changing prices. Specifically, Concepts Statement No. 1, Objectives of Financial Reporting by Business Enterprises has stressed the importance of providing information useful in assessing future cash flows: (1978, p. 17-18).

> ... Financial Reporting should provide information to help investors, creditors and others assess the amounts, timing, and uncertainty of prospective net cash inflows to the related enterprise.

Although the FASB's specific objective of cash flow prediction is readily apparent from the above quotation, it appears that the cash flow series might be surrogated by alternative earnings numbers. Perhaps, GPPA data provide a useful supplement to historical cost information in the assessment of prospective cash flows. Concepts Statement No. 1 (1978, p. 21) provides an interesting commentary on this issue:

> The primary focus of financial reporting is information about an enterprise's performance provided by measure of earnings and its components. Investors, creditors and others who are concerned with assessing the prospects for enterprise net cash flows are especially interested in that information. Their interest in an enterprise's future cash flows and its ability to generate favorable cash flows leads primarily to an interest in information about its earnings rather than information directly about its cash flows.

We note that virtually no evidence on the statistical behavior of GPPA earnings data has been provided in the accounting literature since FASB Statement #33 was promulgated. A priori reasoning invoked by FASB pronouncements has not provided convincing evidence regarding the potential

utility of generating GPPA data. Although the empirical evidence provided in this study is not sufficient to prove or disprove the a priori reasoning inherent in the FASB statements, it will shed additional light on the descriptive properties of GPPA data and its correlation with cash flow data.

DATA

Data requirements in this study were substantial due to the necessity of GPPA adjustments and cash flow estimations. Moreover, the bivariate time-series analysis required at least fifty observations for the three series analyzed: Quarterly GPPA earnings, HC earnings and CF data. In effect, both cross-sectional as well as time series constraints were present. Knowledge of detailed quarterly financial statement items was necessary to generate reasonable GPPA and CF estimations for each sample firm.

Our analysis is concentrated on a sample of firms from the airline industry.[3] Firms in this industry are required to report detailed quarterly financial statement information to the Civil Aeronautics Board (CAB). The information is consolidated and reported by the CAB in the Air Carrier Financial Statistics. Our sample is comprised of 23 firms in the airline industry on which sufficient cross-sectional and time series data were available. We concentrated on the airlines industry due to the uniform GAAP reporting procedures employed and relatively high comparability across firms with respect to reporting format. We began the analysis with thirty firms but seven firms were eliminated due to data unavailability. Sixty-seven quarters of data were collected beginning with the first quarter 1962 and terminating with the third quarter, 1978. Although our sampling criteria and

data requirements precluded a random sample from being drawn, we feel that a significant number of firms in the airlines industry was represented.[4]

GPPA MODEL CONSIDERATIONS

The Davidson and Weil model (1975) was used to estimate GPPA quarterly "operating profit or (loss)" with some minor modifications. We estimated GPPA earnings because detailed financial data are not presently available to permit the use of "actual" GPPA on an extensive time series basis.[5] First, the Consumer Price Index for all Urban Consumers (CPI) was employed rather than the GNP Implicit Price Deflator Index. FASB has specified the use of the CPI due to its ready availability and the fact that it may be a better indicator of the effects of inflation for financial statement users.[6] Second, since the airline industry is predominantly service oriented, problems of inventory adjustment (i.e., FIFO vs. LIFO) were effectively avoided.

Third, the CAB Air Carrier Financial Statistics did not report the actual depreciation method employed by reporting firms. However, we were able to obtain the depreciation methods used by more than half the sample firms from the appropriate Moody's Transportation Manual. In all cases the straight-line method was used for external reporting purposes. We therefore assumed that the remaining sample firms also used the straight-line method. This assumption appears reasonable and was also employed by Parker (1977) in his GPPA study using COMPUSTAT data.

Fourth, unlike previous research which analyzed annual GPPA data, this study concentrates on quarterly data. By employing quarterly data, we have implemented certain refinements in the GPPA estimation process. Basically,

all GPPA estimation models must invoke a proportionality or averaging assumption regarding the occurrence of revenue and expense items throughout the period. For example, it would be assumed that a firm which reported $10 million in annual sales would have generated those sales evenly throughout the year. Actual quarterly sales data allow more detailed specification of the seasonality patterns inherent in the data (i.e., perhaps actual sales were $1 million, $2 million, $4 million and $3 million per quarter). The extensive literature on the time series properties of interim accounting data is supportive of such seasonality patterns (see Foster (1977)).

Ketz (1978) compared several similar GPPA estimation models: Petersen (1973), Davidson and Weil (1975) and Parker (1977), with actually calculated airline data. The actually calculated GPPA data were generated by McKenzie (1970) from Civil Aeronautic Board data. It was concluded by Ketz that

> All three of the algorithms were found to be good estimations of the general price level balance sheets ..... and any of them would be a valid tool to use in general price level studies. (p. 959)

Ketz's findings are particularly germane to the present study given our concentration on airline industry data. Moreover, by employing interim data with the Davidson and Weil (1975) model we are avoiding the assumption that revenues and expenses are incurred uniformly throughout the year.

CASH FLOW CALCULATIONS

We estimated cash flow from operations using the methodology employed by Iceman (1977) and Khumawala (1978). We concentrated upon cash flows from operations since our earnings numbers were based on operating income. Specifically, the calculations which we employed were as follows:[7]

Operating Income

+ Depreciation Expense

+ Amortization Expense

+(-) Changes in Working Capital (excluding cash)

Cash Flows from operations

METHODOLOGY

We report several types of descriptive statistics on the three series of interest: 1) Quarterly Earnings - HC, 2) Quarterly Earnings - GPPA, and 3) Quarterly CF. First, mean-variance data on all series are provided. These results will enable us to assess partially the impact of GPPA transformations on the levels of the earnings series. Additionally, comparisons between both earnings series and the cash flow series might reveal inherent relationships between the alternative income measures and cash flows. Second, correlational statistics are provided among all pair-wise combinations of the three series. Zero-order as well as partial correlations are generated to explore whether the signals provided by these alternative disclosures are unique or related. Finally, bivariate time-series cross-correlation functions are generated for all pair-wise combinations of the series to provide preliminary information on the lead/lag relationships between the two-earnings series and the cash flow series.

MEAN-VARIANCE STATISTICS

Table 1 presents information on the means of the HC and GPPA earnings series as well as the CF series across the entire data bases. Although sixty-seven data points were available for both the HC and GPPA earnings series, we have deleted the first observation (first quarter 1962) to make

the length of these series comparable to the cash flow series. Recall that the change in net working capital was used to generate the first cash flow number which effectively reduced the length of the data bases from sixty-seven to sixty-six observations. Therefore, all three series begin with the second quarter, 1962 and terminate with the third quarter, 1978.

Insert Table 1 here

Upon close inspection of Table 1, certain patterns emerge across the series. First, the mean of the cash flow series for each firm is consistently greater than the corresponding HC and GPPA earnings mean. Secondly, the GPPA earnings means are less than the corresponding sample firms HC earnings means in all but four instances. The first result is not surprising due to the net positive effect of adding back depreciation, amortization and net working capital changes to the operating income number to derive cash flows. The capital intensity of the airlines industry also helps to explain the relationship between the two earnings series. It appears that price-level adjustments to depreciation and amortization expenses more than offset any purchasing power gains on net monetary items experienced by nineteen of the sample firms.

Insert Table 2 Here

Table 2 presents standard deviations for GPPA and HC earnings series and the CF series across the entire time period covered by the data bases. The standard deviations for GPPA earnings and the CF series are greater than those for HC earnings for each sample firm.[8] The cash flow standard

deviations also exceed the GPPA figures for eighteen of twenty-three sample firms. Finally, the standard deviations for the GPPA series exceed those for the HC series on every occasion. It appears that the differences between the standard deviations for the HC and GPPA earnings series might stem from the price level adjustments on sales revenue, cash operating expenses, depreciation and amortization expenses and net monetary assets. The volatility in these adjustments has evidently contributed to the relatively higher standard deviations exhibited by the GPPA series.

CORRELATIONAL STATISTICS

Zero-order, Pearson product-moment correlations were computed for all pairwise combinations of the three series. Table 3 summarizes these correlation coefficients across the entire sample of firms while Table 4 provides these statistics for the individual sample firms. These results indicate a very strong positive association between Historical Cost (X_1) and GPPA (X_2) earnings ($r_{X_1X_2} = .8141$). We also note that the association between HC earnings (X_1) and Cash Flow data (Y) ($r_{X_1Y} = .4704$) is approximately twice as strong as that between GPPA earnings (X_2) and Cash Flow data (Y) ($r_{X_2Y} = .2367$).

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Insert Tables 3, 4, and 5 Here

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Inspection of Table 4 reveals a consistently strong association between HC and GPPA earnings for individual sample firms as well. In fact, twenty-one of the sample firms had $r_{X_1X_2}$ values greater than .70. Using the student's t test and a two-tailed test of significance[9] revealed that the

$r_{X_1X_2}$ values for each sample firm were significantly different from zero ($\alpha = .001$). The patterns exhibited by the r_{X_1Y} values were more varied. For twenty-one sample firms (all except nine and twenty-one), the corresponding r_{X_1Y} values exceeded the r_{X_2Y} values. This finding is suggestive of a consistently stronger association between HC earnings and Cash Flow (r_{X_1Y}) than GPPA earnings and Cash Flow (r_{X_2Y}). Only two r_{X_1Y} values were not significantly different from zero at the $\alpha = .05$ level or higher. However, nine firms exhibited r_{X_2Y} values which were insignificant.

The mean r-squared values in Table 4 indicate the percentage variation in the dependent variable (cash flow series) which was explained by the independent variables (HC or GPPA earnings). Approximately twenty-six percent of the variance in the CF series was explained by variation in the HC earnings series. Similarly, nine percent was explained by the GPPA earnings series. Due to the high correlation between HC and GPPA earnings ($r_{X_1X_2}$ = .8141), an attempt was made to control for the effects of HC and GPPA separately on the cash flow series via partial correlation analysis.

Table 5 presents two sets of partial correlations: 1) the partial correlation between HC Earnings and CF controlling for the effects of GPPA earnings ($r_{X_1Y,X_2} = .4672$) and 2) the partial correlation between GPPA earnings and Cash Flows controlling for the effects of Historical Cost earnings ($r_{X_2Y,X_1} = .2872$). The mean r-squared values in Table 5 are similar to the percentage variation figures reported in Table 4. Specifically, $r^2_{X_1Y,X_2} = .2644$ ($r^2_{X_1Y} = .2617$) and $r^2_{X_2Y,X_1} = .1089$ ($r^2_{X_2Y} = .0922$). Thus, the percentage variation of the CF series which was explained by either the HC or GPPA earnings series separately, after having controlled for the other earnings series, was approximately the same as that indicated by the simple correlation analysis. However, the inverse relationship between GPPA

earnings and Cash Flows ($r_{X_2 Y, X_1} = -.2878$) is highlighted by the partial correlation analysis. This inverse relationship is consistent with the Table 1 mean values for GPPA earnings and CF. In other words, the GPPA earnings series was generally smaller than the HC earnings series while the CF series was greater.

BIVARIATE TIME-SERIES ANALYSIS

Although the overall tenor of the intuitively appealing correlation analysis reported above is suggestive of a stronger HC-CF relationship than GPPA-CF, potential dependencies across the three data sets motivated the consideration of a more rigorous analysis via Bivariate time-series techniques.[10] Figure 1 provides a graphic portrayal of the single input transfer function modeling exercise which was conducted. It illustrates the relationship between the input series - either HC (X_1) or GPPA (X_2) earnings and the output series - CF (Y).

The portion of the bivariate modeling process which is germane to the present analysis involves the examination of the cross-correlation function between the input and output series. The sample cross-correlation function is defined in the following manner:

$$r_{X_i, Y} = \frac{C_{X_i Y}(K)}{S_{X_i} S_Y} \qquad 1)$$

Where X_i = input series such that:

X_1 = HC earnings

X_2 = GPPA earnings

Y = output series : cash flows

$C_{X_iY}(K)$ = sample cross-covariance coefficients between X_i and Y at K lags.

S_{X_i} = standard deviation of X_i (input series)

S_y = standard deviation of Y (output series)

Insert Figure 1 Here

The sample cross-correlations serve as relative measures of association between the input and output series. Numerical values range from -1 to +1 wherein a value close to -1 (+1) indicates a strong negative (positive) relationship betwen X_t (input series at time -t) and Y_{t+k} (output series at time t+k). We computed $r_{X_1Y}(k)$ and $r_{X_2Y}(k)$ for k=0, $\pm$ 1, $\pm$ 2 ..... $\pm$ 12 which represent the cross-correlations between HC earnings and CF and GPPA earnings and CF, respectively.

Considerable simplification in the identification stage of the bivariate time-series methodology occurs if the input and output series are "pre-whitened." Pre-whitening is a data transformation technique which allows for the construction of standard errors which can be used for significance testing.[11] It essentially rids the input and output series of all nonessential patterns of variation which might obscure the between series variation. In other words, the within-series variation is removed to examine more efficiently the between series variation. Thus, the potential dependencies in the raw data are circumvented by working with transformed residuals.

A univariate autoregressive-integrated-moving-average (ARIMA) model is employed typically on the dependent variable (output series - CF) yielding a series of "white-noise" residuals. The same ARIMA model is then used upon the independent variable (input series: either HC or GPPA earnings). We

employed the premier model recommended by Brown and Rozeff (1979) and supported by Collins and Hopwood (1980) upon both series. In (pdq)X(PDQ) notation, it is represented as follows: (100)X(011). Since pre-whitening circumvents the potential data dependency problems which affected our earlier correlation analysis, we were able to identify the between series relationships with more precision.

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Insert Tables 6 and 7 Here

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Table 6 presents the r_{X_1Y} cross-correlation function averaged across all sample firms between the pre-whitened HC earnings series (X_1) and the CF series (Y) for lags k=0, $\pm$ 1, $\pm$ 2 ..... $\pm$ 12. We observe that the values of the cross-correlation function for all negative lags are not significantly different from zero when compared to their respective standard errors.[12] Therefore, cash flow values do not appear to serve as useful leading indicators for the HC earnings series. Perhaps of greater concern is whether the HC earnings series serves as a leading indicator for CF given FASB's interest in CF prediction. Since the values of the cross-correlation function for all positive time lags are also not significantly different from zero, we must conclude that the HC earnings series does not appear to be a useful leading indicator for CF. However, we do observe a strong, positive association between contemporaneous values of HC and CF as manifested by the r_{X_1Y} value (.3044) at the zero lag which is significant at α = .05 level.

Table 6 also presents the r_{X_2Y} cross-correlation function between the GPPA earnings and CF series. The values of this function at all lags are insignificantly different from zero, including the lag zero value (.2388). Thus, the contemporaneous association between GPPA earnings and CF is

substantially weaker than that between HC earnings and CF. These findings based on the bivariate time-series methodology are essentially similar to the simple correlation analysis presented earlier.

CONCLUDING REMARKS

Our analyses and results are certainly sample, industry and data specific and are subject to the propriety of the GPPA adjustment model and the cash flow estimation process employed. However, even with the above caveats, we feel that the results are of some importance to FASB given its recent call for varied and divergent research on the effects of changing prices. Moreover, the descriptive results reported herein will enhance the knowledge of the times series properties of GPPA earnings data versus HC earnings and CF. When these findings are contrasted against the results of other studies using similar methodologies on other samples and industries, perhaps policy makers might be in a better position to assess the statistical impact of GPPA transformations.

The Mean-Variance analysis revealed consistently larger and more volatile cash flow numbers than either HC or GPPA earnings. Although the GPPA earnings numbers were generally smaller than their HC earnings counterparts, they were consistently more volatile. Correlational statistics showed a very strong positive association between the signals generated by the GPPA and HC earnings models. However, the contemporaneous association between HC earnings and CF was significantly stronger than the association between GPPA earnings and CF. This finding was demonstrated by the zero-order correlation analysis, the partial correlations, as well as the Bivariate time-series approach.

Neither earnings series appeared to provide useful leading or predictive indicators for forthcoming CF values. However, we must recognize that this finding is subject to potential sampling variation and randomness which could conceivably have distorted the patterns in the three series. We do note, however, that if an input series is used with no predictive value in conjunction with Bivariate time-series analysis, then the transfer function should contain parameters relating solely to the noise model. Whether such a bivariate model would enhance the prediction of cash flows versus univariate alternatives is an empirical issue worthy of examination.

FOOTNOTES

1. See FASB's "Invitation to Comment on the Need for Research on Financial Reporting and Changing Prices" (June, 15, 1981).

2. Although of equal importance, analysis of the current cost data also mandated by FASB Statement No. 33 is beyond the scope of the present analysis.

3. See Appendix A for a listing of sample firms.

4. Rosenberg and Guy (1976) reported that the airlines industry possesses the highest average industry beta among the thirty-nine industries which they examined. Perhaps the effect of GPPA transformations on earnings data might be augmented when performed on firms in this relatively volatile industry.

5. The FASB has announced the availability of a computerized data bank of inflation-adjusted information as reported by 1,100 companies that are subject to FASB Statement No. 33. The project is spearheaded by FASB, public accounting firms and the Columbia University Graduate School of Business. Unfortunately, it will be quite some time before extensive time-series data similar to that used in this present study are available.

6. See FASB Statement No. 33.

7. The cash flow calculations are also consistent with those advocated by APB Opinion No. 19, "Reporting Changes in Financial Position."

8. In a supplementary analysis we divided the data bases in half and computed standard deviations for each subsample. Although the GPPA earnings data did have larger standard deviations than the HC earnings across the entire data bases, the relative increase in standard deviation of the later subsample compared to the earlier subsample was smaller. In other words, the GPPA transformations served as a relative variance reduction mechanism over the more recent data.

9. The tests of significance are intended for illustrative purposes only and extreme caution should be exercised when the results are interpreted. Unfortunately, potential time-series and cross-sectional dependencies in the data prohibit a literal interpretation. In the next section of the paper the above dependencies are controlled for by using "pre-whitened" input and output series.

10. See Box and Jenkins (1970) for a complete discussion of the bivariate time-series methodology.

11. See Box and Jenkins (1970, pp. 379-380) for a discussion on "pre-whitening."

12. Variances were computed using the following formula: $(n-k)^{-1}$ where n = number of observations of data and k = the appropriate lag of the cross-correlation coefficient. See Box and Jenkins (1970, pp. 376-377) for a discussion on the approximate standard errors of cross-correlation estimates.

APPENDIX A

Sample Firms

1. Airlift International
2. Alaska Airlines
3. Aloha Airlines
4. American Airlines
5. Continental Airlines
6. Delta Airlines
7. Eastern Airlines
8. Tiger International Airlines
9. Hawaiian Airlines
10. National Airlines
11. North Central Airlines
12. North West Airlines
13. Ozark Airlines
14. Pan American Airways
15. Piedmont Airlines
16. Reeve Airlines
17. Seaboard World Airlines
18. Southern Airways
19. Texas International Airlines
20. Trans World Airlines
21. UAL (United Airlines)
22. Western Airlines
23. Allegheney Airlines

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FIGURE 1

Bivariate Modeling Process

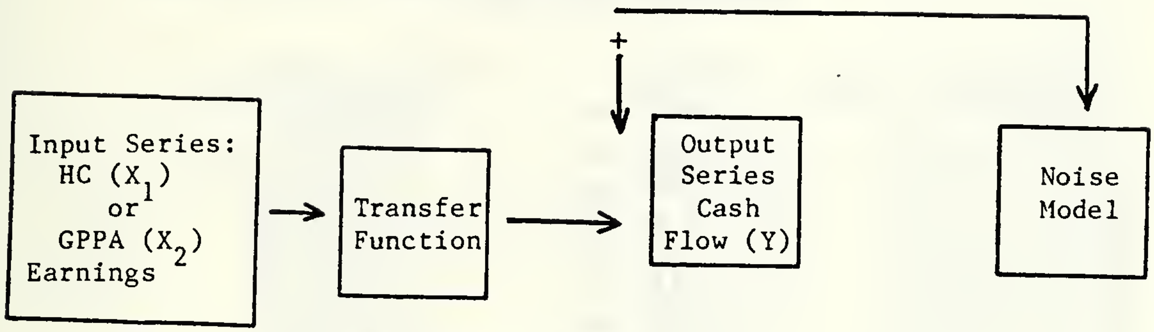

Table 1

Mean Values* for Historical Cost Earnings, GPPA Earnings and Cash Flow Data

	Historical Cost	GPPA	Cash Flow
1.	207.909	-266.803	809.273
2.	298.197	-91.292	896.939
3.	191.667	85.826	451.621
4.	11,979.667	-665.429	41,225.621
5.	6,800.636	3,233.381	15,950.273
6.	23,317.061	22,358.660	44,194.424
7.	7,596.303	-6,945.405	29,843.076
8.	3,697.333	4,147.835	6,264.409
9.	320.864	90.278	927.606
10.	6,946.318	6,252.290	13,708.561
11.	1,950.455	1,270.903	3,897.349
12.	16,487.015	17,520.424	33,382.818
13.	1,205.349	363.189	2,697.591
14.	9,160.227	-5,093.467	37,557.682
15.	1,266.318	127.184	3,142.500
16.	168.985	264.161	299.303
17.	1,242.424	1,311.004	2,409.333
18.	514.712	16.768	1,461.439
19.	451.727	-342.615	1,544.303
20.	8,517.000	-6,904.133	33,648.561
21.	21,358.212	2,903.115	58,918.652
22.	5,590.030	3,058.787	13,363.136
23.	2,699.379	672.542	5,925.409

* In millions

Table 2

Standard Deviations* for Historical Cost Earnings, GPPA Earnings and Cash Flow Data

	Historical Cost	GPPA	Cash Flow
1.	1,371.301	2,583.062	3,007.99
2.	1,572.167	2,040.454	2,131.664
3.	570.214	865.078	806.671
4.	21,134.349	37,077.303	52,436.704
5.	5,191.063	8,764.554	11,217.862
6.	14,548.038	14,708.394	32,338.751
7.	11,071.452	19,295.657	35,767.372
8.	3,920.426	5,516.102	8,174.938
9.	501.176	824.663	2,601.901
10.	5,945.649	11,311.146	15,869.876
11.	2,829.155	3,024.169	4,479.120
12.	11,645.146	23,663.182	20,625.828
13.	1,727.347	1,801.673	3,336.729
14.	33,415.662	60,805.492	49,705.554
15.	1,761.676	2,217.833	3,857.072
16.	326.688	574.234	465.770
17.	1,791.440	2,978.257	4,465.801
18.	1,140.601	1,399.894	2,635.338
19.	1,405.526	1,761.085	3,676.302
20.	32,885.837	55,283.437	40,828.697
21.	36,245.448	51,637.725	72,120.808
22.	6,534.624	10,852.872	13,827.369
23.	5,045.882	5,702.420	7,214.770

* In Millions

Table 3

Mean Product-Moment Correlation Coefficients Across Entire Sample

	Historical Cost	GPPA	Cash Flow
Historical Cost	1.000	.8141	.4704
GPPA		1.000	.2367
Cash Flow			1.000

Table 4

Pearson Product Moment Correlations Analysis

	r_{X_1Y}	$r^2_{X_1Y}$	r_{X_2Y}	$r^2_{X_2Y}$	$r_{X_1X_2}$	$r^2_{X_1X_2}$
1.	.4165[c]	.1734	.4076[c]	.1661	.9606[c]	.9228
2.	.5706[c]	.3256	.4816[c]	.2319	.9648[c]	.9308
3.	.3763[c]	.1416	.2406[a]	.0579	.9487[c]	.9000
4.	.2447[a]	.0599	.0678	.0046	.7936[c]	.6298
5.	.4761[c]	.2267	-.1096	.0120	.4864[c]	.2366
6.	.8045[c]	.6472	.0600	.0036	.3952[c]	.1562
7.	.5277[c]	.2785	.0913	.0083	.6170[c]	.3807
8.	.7000[c]	.4900	.5500[c]	.3025	.8859[c]	.7848
9.	.0069	.0000	-.0626	.0039	.8663[c]	.7505
10.	.5066[c]	.2566	.2728[a]	.0744	.7917[c]	.6268
11.	.6747[c]	.4552	.3985[c]	.1588	.8772[c]	.7695
12.	.6694[c]	.4481	.2377[a]	.0565	.7489[c]	.5609
13.	.5849[c]	.3421	.2833[a]	.0803	.8196[c]	.6717
14.	.2853[b]	.0814	.1967	.0387	.9136[c]	.8347
15.	.6638[c]	.4406	.2734[a]	.0747	.7251[c]	.5258
16.	.5701[c]	.3250	.5520[c]	.3047	.9457[c]	.8943
17.	.2132[a]	.0455	.1615	.0261	.9190[c]	.8446
18.	.5547[c]	.3077	.2908[b]	.0846	.8340[c]	.6956
19.	.3928[c]	.1543	.2049[a]	.0420	.8811[c]	.7763
20.	.3750[c]	.1406	.3044[b]	.0927	.9118[c]	.8314
21.	.0965	.0093	-.1016	.0103	.8050[c]	.6480
22.	.3888[c]	.1511	.1234	.0152	.7446[c]	.5544
23.	.7196[c]	.5178	.5206[c]	.2710	.8893[c]	.7909
$\bar{X}$	.4704	.2617	.2367	.0922	.8141	.6834

Where a - significant at $\alpha = .05$ level
b = significant at $\alpha = .01$ level
c = significant at $\alpha = .001$ level

Where X_1 = Historical Cost Earnings
X_2 = GPPA Earnings
Y = Cash Flow
r = Correlation Coefficient

Table 5

Partial Correlation Coefficients for Sample Firms

	r_{X_1Y,X_2}	$r^2_{X_1Y,X_2}$	r_{X_2Y,X_1}	$r^2_{X_2Y,X_1}$
1.	.0983	.0097	.0297	.0009
2.	.4594[c]	.2110	-.3186[b]	.1015
3.	.4823[c]	.2326	-.3972[c]	.1577
4.	.3145[b]	.0989	-.2143[a]	.0459
5.	.6096[c]	.3716	-.4441[c]	.1972
6.	.8515[c]	.7251	-.4727[c]	.2234
7.	.6015[c]	.3618	-.3506[b]	.1229
8.	.5494[c]	.3018	-.2120[a]	.0449
9.	.1225	.0150	-.1372	.0188
10.	.4944[c]	.2444	-.2435[a]	.0593
11.	.7385[c]	.5454	-.5458[c]	.2979
12.	.7634[c]	.5828	-.5354[c]	.2867
13.	.6419[c]	.4120	-.4219[c]	.1780
14.	.2648[a]	.0701	-.1641	.0269
15.	.7029[c]	.4941	-.4038[c]	.1631
16.	.1775	.0315	.0479	.0023
17.	.1666	.0278	-.0895	.0080
18.	.5913[c]	.3496	-.3742[c]	.1401
19.	.4585[c]	.2102	-.3246[b]	.1054
20.	.2491[a]	.0621	-.0985	.0097
21.	.3020[b]	.0912	-.3035[b]	.0921
22.	.4483[c]	.2010	-.2701[b]	.0730
23.	.6574[c]	.4322	-.3759[c]	.1413
$\bar{X}$	.4672	.2644	-.2878	.1089

Where: a = significant at α = .05 level
b = significant at α = .01 level
c = significant at α = .001 level

Where: X_1 = Historical Cost Earnings
X_2 = GPPA Earnings
Y = Cash Flow

Table 6

Cross Correlation Coefficients

k Lag	Input (H/C Earnings) Output (Cash Flow) $r_{X_1 Y}(k)$ Coefficient	Input (GPPA Earnings) Output (Cash Flow) $r_{X_2 Y}(k)$ Coefficient	Standard Error
-12	-.0528	-.0481	.1387
-11	-.0873	-.0823	.1374
-10	-.0881	-.0562	.1361
- 9	-.0423	-.0473	.1348
- 8	-.0146	-.0371	.1336
- 7	.0041	-.0051	.1325
- 6	.0242	.0130	.1313
- 5	-.0058	-.0175	.1302
- 4	.0219	-.0029	.1291
- 3	.0364	.0013	.1280
- 2	.1022	.0566	.1270
- 1	.1145	.0669	.1260
0	.3044*	.2388	.1250
1	.1583	.1606	.1260
2	.1695	.1413	.1270
3	.1164	.1217	.1280
4	.0117	.0419	.1291
5	-.0187	.0032	.1302
6	-.0129	-.0229	.1313
7	-.0376	-.0093	.1325
8	.0411	.0425	.1336
9	.0012	-.0055	.1348
10	.0225	-.0023	.1361
11	.0384	-.0256	.1374
12	.0174	-.0473	.1387

* significant at $\alpha = .05$